Agenda

① See your LCQ 9.1

② Mini lesson

③ Time to work, in class, on
   Unit 4 - PPC - FRQ.

Learning Target

Use a confidence interval to
make a conclusion for a
two-sided test about a
population parameter

An increasing practice in
Statistics in the real world.

Two-Sided Tests and Confidence Intervals
(pages 595-597)

- Confidence intervals give more information than significance tests
- Perfect connection between intervals and two-sided tests about a mean

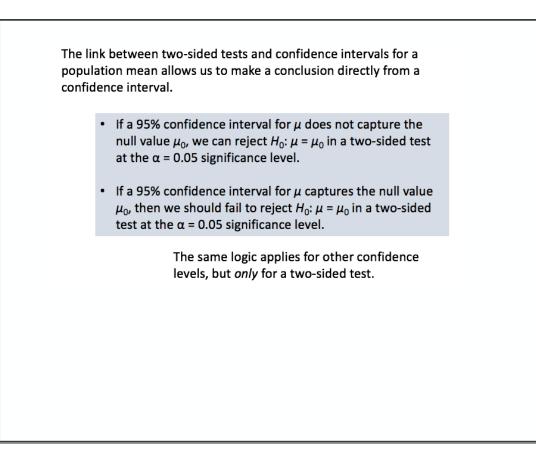standardized test statistic: $t = \dfrac{\bar{x} - \mu_0}{\dfrac{s_x}{\sqrt{n}}}$ confidence interval: $\bar{x} \pm t^* \dfrac{s_x}{\sqrt{n}}$

The link between two-sided tests and confidence intervals for a population mean allows us to make a conclusion directly from a confidence interval.

- If a 95% confidence interval for μ does not capture the null value μ_0, we can reject $H_0: \mu = \mu_0$ in a two-sided test at the $\alpha = 0.05$ significance level.

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- If a 95% confidence interval for μ does not capture the null value μ_0, we can reject H_0: $\mu = \mu_0$ in a two-sided test at the $\alpha = 0.05$ significance level.

- If a 95% confidence interval for μ captures the null value μ_0, then we should fail to reject H_0: $\mu = \mu_0$ in a two-sided test at the $\alpha = 0.05$ significance level.

The same logic applies for other confidence levels, but *only* for a two-sided test.

Handout

Are radio stations honest?

A classic-rock radio station claims to play an average of 50 minutes of music every hour. To investigate the station's claim, you randomly select 12 different hours during the next week and record what the radio station plays in each of the 12 hours. Here is how much music (in minutes) was played during each of these hours:

```
48   49   50   51   49   53
49   47   47   50   46   48
```

(a) State an appropriate pair of hypotheses for a significance test in this setting. Be sure to define the parameter of interest.

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49   47   47   50   46   48
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(a) State an appropriate pair of hypotheses for a significance test in this setting. Be sure to define the parameter of interest.

$H_0: \mu = 50$

$H_a: \mu \neq 50$

where μ = true mean play time (min) of music in all hours this week.

Assume that the conditions have been checked and you are all clear to perform a test.

(b) A 95% confidence interval for the mean play time (in minutes) of all hours this week is $(47.691, 50.142)$. Based on this interval, what conclusion would you make for a test of the hypotheses in part (a) at the $\alpha = 0.05$ significance level? [Ask: According to the confidence interval, is the null hypothesis value a plausible value?]

(c) Can we generalize our conclusion for this radio station for the whole year? Explain your answer.

According to the Confidence Interval, is the null hypothesis value a plausible value?

If not, you fail to reject H_0.

Assume that the conditions have been checked and you are all clear to perform a test.

(b) A 95% confidence interval for the mean play time (in minutes) of all hours this week is $(47.691, 50.142)$. Based on this interval, what conclusion would you make for a test of the hypotheses in part (a) at the $\alpha = 0.05$ significance level? [Ask: According to the confidence interval, is the null hypothesis value a plausible value?]

Yes. The 95% CI does include 50 as a plausible value so we fail to reject H_0. We do not have convincing that the true mean hourly play time differs from 50 min.

(c) Can we generalize our conclusion for this radio station for the whole year? Explain your answer.

Assume that the conditions have been checked and you are all clear to perform a test.

(b) A 95% confidence interval for the mean play time (in minutes) of all hours this week is (47.691, 50.142). Based on this interval, what conclusion would you make for a test of the hypotheses in part (a) at the $\alpha = 0.05$ significance level? [Ask: According to the confidence interval, is the null hypothesis value a plausible value?]

Yes. The 95% CI does include 50 as a plausible value so we fail to reject Ho. We do not have convincing that the true mean hourly play time differs from 50 min.

(c) Can we generalize our conclusion for this radio station for the whole year? Explain your answer.

No. We can only generalize our conclusions to the population from which we took our sample. We can only generalize our results to this one week.

(to generalize to the whole year we would have had to sample from the whole year)

HW
Lottery

Personal Progress Checks

- remember . . . their intended purpose in
  our class is to get you to review
  previous content.

- So . . . take your time. Look things up.

PPC's

[Unit 4 MCQ A, B, C]

are due no later than
Sunday, Feb 2 at 11:30ᴾᵐ.

We'll continue Ch. 9 on Monday

Ch. 9 Test will be
on Wednesday.

Today - Work on UNIT 4
                 PPP - FRQ
                      free response

- with your team

  - FRQ #1, turn in both the question sheet
    any your response once you finish

  - Then start FRQ #2

Assignment
This weekend - Work on Unit 4 PPC
                        MCQ A, B, C